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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,653	02/28/2006	Shuichi Ichikawa	126975	2424

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EXAMINER	
GUGLIOTTA, NICOLE T	
ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
04/29/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,653	ICHIKAWA ET AL.	
	Examiner	Art Unit	
	NICOLE T. GUGLIOTTA	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6 - 10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6 - 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 19, 2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 6, 8 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al. (US 2003/0021949 A1), as evidenced by Haby (The Weather Prediction) and The Weather Channel (www.weather.com/glossary/a.html), in view of Farrauto et al. (U.S. Patent No. 5,462,907) .

4. In regard to claims 6 & 9, Tomita et al. disclose a honeycomb filter formed by extrusion (Example 1, Section [0045]) and

> a process for producing a **silicon carbide-based porous body**, characterized by adding metallic silicon and an organic binder to **raw material silicon carbide** particles, mixing them, molding the mixture to a predetermined shape, calcinating the molded material in an oxygen-containing atmosphere to remove the organic binder in the molded material, and firing the calcinated body to obtain a silicon carbide-based porous body wherein an **oxygen-containing phase is formed at the surfaces of the silicon carbide** particles and/or the metallic silicon or in the vicinity of the surfaces thereof (Section [0018]).

5. The oxygen-containing phase disclosed by Tomita et al. above corresponds to Applicants' "oxide film on the surface of the porous honeycomb structure."

6. In regard to Applicant's limitation for the presence of oxygen and steam, Examiner notes that air contains 20.9% oxygen (www.weather.com, see definition for "air") and water vapor in trace amounts to about 4%, as evidenced by Meteorologist Jeff Haby's discussion of Atmospheric Water Vapor (www.theweatherprediction.com). Therefore, steam (water vapor) is inherently present in the atmosphere of the oxide phase forming step disclosed by Tomita et al.

7. In regard to the sequence of steps for claim 6, Tomita et al. disclose calcinating for "debindering", firing (sintering), and then heat-treatment (Sections [0048] - [0049], Examples 3 - 9).

8. In regard to the sequence of steps for claim 9, Applicants have failed to demonstrate firing before the heat-treatment and catalyst loading (as opposed to afterward, as disclosed by Tomita et al.) produce new or unexpected results, and therefore Applicants' claim limitation is *prima facie* obvious in the absence of new or unexpected results. *Ex Parte Rubin*, 128 USPQ 440. MPEP 2144.04 (Changing Sequence of Steps).

9. Tomita et al. does not teach the limitation of a catalyst containing alumina and ceria. However, Farrauto et al. disclose a catalytic coating comprising alumina and ceria for carriers such as silica-containing and other refractory metal honeycombs (Col. 7, Lines 1 – 24).

> The oxidation catalysts of the present invention [alumina and ceria] avoid or reduce the unwanted side effect of promoting the oxidation of SO_2 to SO_3 which, as noted above, contributes to the particulates problem because the condensation of sulfuric acid and other sulfate condensibles which accumulate on, and add to, the mass of the particulates in the exhaust (Col. 5, Lines 44 -51)…that a ceria-alumina catalytic material comprising essentially only ceria and alumina of sufficiently high surface area (10 m2/g or higher), dispersed on a suitable carrier, provides a durable and effective diesel oxidation catalyst (Col. 6, Lines 34 - 39).

10. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the honeycomb with the silica coating disclosed by Tomita et al. with the catalyst coating disclosed by Farrauto et al. because an alumina/ceria catalyst coating reduces unwanted oxidation of SO_2 to SO_3, as well as produce durable and effective diesel oxidation catalysts.

11. In regard to claims 8 & 10, Tomita et al. disclose heat treatment in oxidizing atmosphere at 500 – 1600°C (Section [0022]).

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al., as evidenced by Haby & The Weather Channel Glossary, in view of Farrauto et al., and further in view of Irick, Jr. et al. (U.S. Patent No. 4,957,779).

13. Tomita et al. and Farrauto et al. are silent in regard to the fuel source for the heat-treatment step. However, Irick, Jr. et al. disclose a method for producing a protective oxidizing layer on a ceramic body by the combustion reaction of natural gas in the furnace with air (an "oxygen-containing gas" (Col. 5, Lines 1- 5) and other additives (Col. 6, Lines 64 – 68; Col. 13, Lines 48 – 53). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the limitation of the heat-treatment of Tomita et al. with the fuel source of natural gas and air, which contributes to producing a protective oxidized layer on a ceramic substrate, as suggested by Irick, Jr., et al.

14. Claims 6 & 8 - 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al., in view of Saha et al. (WO 03/082773), and further in view of Farrauto et al.

15. In regard to claims 6 and 9, In regard to claims 6 & 9, Tomita et al. disclose a honeycomb filter formed by extrusion (Example 1, Section [0045]) and

> a process for producing a **silicon carbide-based porous body**, characterized by adding metallic silicon and an organic binder to **raw material silicon carbide** particles, mixing them, molding the mixture to a predetermined shape, calcinating the molded material in an oxygen-containing atmosphere to remove the organic binder in the molded material, and firing the calcinated body to obtain a silicon carbide-based porous body wherein an **oxygen-containing phase is formed at the surfaces of the silicon carbide** particles and/or the metallic silicon or in the vicinity of the surfaces thereof (Section [0018]).

16. The oxygen-containing phase disclosed by Tomita et al. above corresponds to Applicants' "oxide film on the surface of the porous honeycomb structure."

17. In regard to the sequence of steps for claim 6, Tomita et al. disclose calcinating for “debindering”, firing (sintering), and then heat-treatment (Sections [0048] - [0049], Examples 3 - 9).

18. In regard to the sequence of steps for claim 9, Applicants have failed to demonstrate firing before the heat-treatment and catalyst loading (as opposed to afterward, as disclosed by Tomita et al.) produce new or unexpected results, and therefore Applicants' claim limitation is *prima facie* obvious in the absence of new or unexpected results. *Ex Parte Rubin*, 128 USPQ 440. MPEP 2144.04 (Changing Sequence of Steps).

19. Tomita et al. do not explicitly note the presence of steam in their heat-treatment process. However, Saha et al. disclose a heat-treatment in oxidizing atmospheres, such as water vapor (steam) at 1,000°C, are used in the manufacturing of ceramic honeycomb filters to improve retained strength (pg. 2, Lines 15 - 24 & pg. 10, Line 29 - pg. 11, Line 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to expose a honeycomb substrate, such as that disclosed by Tomita et al., to an oxidizing atmosphere, such as steam, in order to improve the strength of the structure, as taught by Saha et al.

20. Neither Tomita et al. or Saha et al. teach the limitation of a catalyst containing alumina and ceria. However, Farrauto et al. disclose a catalytic coating comprising alumina and ceria for carriers such as silica-containing and other refractory metal honeycombs (Col. 7, Lines 1 – 24).

> The oxidation catalysts of the present invention [alumina and ceria] avoid or reduce the unwanted side effect of promoting the oxidation of SO_2 to SO_3 which, as noted above,

> contributes to the particulates problem because the condensation of sulfuric acid and other sulfate condensibles which accumulate on, and add to, the mass of the particulates in the exhaust (Col. 5, Lines 44 -51)…that a ceria-alumina catalytic material comprising essentially only ceria and alumina of sufficiently high surface area (10 m2/g or higher), dispersed on a suitable carrier, provides a durable and effective diesel oxidation catalyst (Col. 6, Lines 34 - 39).

21. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the honeycomb with the silica coating disclosed by Tomita et al. with the catalyst coating disclosed by Farrauto et al. because an alumina/ceria coating reduces unwanted oxidation of SO_2 to SO_3, as well as produce durable and effective diesel oxidation catalysts.

22. In regard to claims 8 & 10, Tomita et al. disclose heat treatment in oxidizing atmosphere at 500 – 1600°C (Section [0022]).

23. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al., Saha et al. and Farrauto et al., as above in claim 6, and further in view of Irick, Jr. et al. (U.S. Patent No. 4,957,779).

24. Tomita et al, Saha et al., and Farrauto et al. are all silent in regard to the fuel source for the heat-treatment step. However, Irick, Jr. et al. disclose a method for producing a protective oxidizing layer on a ceramic body by the combustion reaction of natural gas in the furnace with air (an “oxygen-containing gas” (Col. 5, Lines 1- 5) and other additives (Col. 6, Lines 64 – 68; Col. 13, Lines 48 – 53). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the

limitation of the heat-treatment of Tomita et al. with the fuel source of natural gas and air, which contributes to producing a protective oxidized layer on a ceramic substrate, as suggested by Irick, Jr., et al.

Response to Arguments

25. Applicants argue, "Specifically, claims 6 and 9 are amended to recite '…firing the resulting honeycomb structure to obtain a porous honeycomb structure with an oxide film on the surface of the porous honeycomb structure with an oxide film on the surface of the porous honeycomb structure, and loading, on the surface of the porous honeycomb structure via the oxide film, a catalyst containing alumina and ceria as main components...' The applied references fail to teach or suggest or establish any reason or rationale to provide such a combination of features, as recited in claims 6 and 9" (Remarks, Pg 5).

26. Applicants' arguments with respect to claims 6 and 9 have been considered but are moot in view of the new ground(s) of rejection.

27. Applicants argue, "There is no indication in Dawes that the presence of steam will promote oxide film formation as required by the methods of claims 6 and 9, without a continuous layer of carbon present" (Remarks, Pg 5).

28. Applicants' arguments with respect to claims 6 and 9 have been considered but are moot in view of the new ground(s) of rejection.

29. Applicants argue Dawes et al. disclose the types and amounts of catalyst precursors are limited and must be compatible. Dawes fails to list ceria and alumina in the list of compatible catalysts (Remarks, Pg 5).

30. Applicant's arguments with respect to the rejection(s) of claim(s) 6 and 9 under Dawes et al. have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Tomita et al., Saha et al., and Farrauto et al.

31. Applicants argue "Furthermore, the patentability of the claims is supported by the unexpected results that show the oxygen content of a sample can be increased by conducting the heat treatment (even at a lower temperature) in the presence of steam" (Remarks, Pg 7).

32. Applicants' arguments with respect to claims 6 and 9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is (571)270-1552. The examiner can normally be reached on M - F 8:30 - 6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

NICOLE T. GUGLIOTTA
Examiner
Art Unit 1794